UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/883,081	06/15/2001	Joshua E. Rothenberg	060901/P006CP1/10103165	8654

29053 7590 04/23/2003

DALLAS OFFICE OF FULBRIGHT & JAWORSKI L.L.P.
2200 ROSS AVENUE
SUITE 2800
DALLAS, TX 75201-2784

EXAMINER	
KIM, RICHARD H	
ART UNIT	**PAPER NUMBER**
2882	

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/883,081	Applicant(s) ROTHENBERG ET AL.	
	Examiner Richard H Kim	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-69 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-69 is/are rejected.

7)☒ Claim(s) 8,10,19, 21, 31 and 33 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 15 June 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 8, 10, 19, 21, 31 and 33 recites the limitation "shifted pixel". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13-15, 17-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tzu (US 6,093,507).

Referring to claim 13, Tzu discloses a device comprising a plurality of bars arranged in a period along a first axis of a mask, with spaces between adjacent bars (see Fig. 9, ref. 23, 25); wherein each of the bars have substantially regular edges (see Fig. 9, ref. 23); and wherein at least one bar includes at least one predetermined irregularity on at least one edge (see Fig. 9, ref. 23 and 25).

Referring to claim 14, Tzu discloses that the one irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge by an amount that is relative to a size of the one irregularity (see Fig. 9, ref. 22).

Referring to claim 15, Tzu et al. discloses that the mask is a phase mask, and the bars have a different thickness in the direction of an optical axis of the mask than the spaces (see Fig.9, abstract).

Referring to claim 17, Tzu et al. discloses that the first and second optical regions are formed from a plurality of pixels (see Fig. 9, ref. 22, 27, 23).

Referring to claim 18, Tzu et al. discloses that the irregularity is an extra pixel (see Fig. 9, ref. 22).

Referring to claim 20, Tzu et al. discloses that the irregularity is a missing pixel (see Fig. 9, ref. 25).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 6-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu in view of Kurihara et al. (US 6,200,711 B1).

Referring to claim 1, Tzu et al. discloses an optical device comprising a substrate (see Fig. 9, ref. 20); and a plurality of first optical regions (see Fig. 9, ref. 27); and a plurality of second optical regions that has a characteristic that is different from the plurality of first optical

regions (see Fig. 9, ref. 23); wherein each of the first and second optical regions have a substantially polygon shape with a plurality of substantially regular edge (see Fig. 9, ref. 23, 27); and wherein at least one first optical region of the plurality of first optical regions includes a least one predetermined irregularity on at least one edge (see Fig. 9, ref. 22). However, the reference does not disclose that the first and second optical regions are interleaved with each other on the substrate.

Kurihara et al. discloses a device wherein a first region and a second region are interleaved on a substrate (see Fig. 5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and second regions interleaved with each other on the substrate since such a modification would vary the thickness of the mask, and as a result enable a diffraction grating to be written on an optical device (see col. 2, lines 17-25). As a result, such a modification would be functionally equivalent.

Referring to claim 2, Tzu discloses that the one irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge by an amount that is relative to a size of the one irregularity (see Fig. 9, ref. 22).

Referring to claim 3, Tzu discloses that the device is a mask and the first and second optical regions form an array (see Fig. 9; col. 4, lines 9-14).

Referring to claim 4, Tzu discloses that the mask is a phase mask and the characteristic is thickness in the direction of an optical axis of the device (see Fig. 9, abstract).

Referring to claim 6, Tzu discloses that the first and second optical regions are formed from a plurality of pixel arranged in the polygon shape (see Fig. 9).

Referring to claim 7, Tzu discloses that the irregularity is an extra pixel (see Fig. 9, ref. 22).

Referring to claim 9, Tzu discloses that the irregularity is a missing pixel (see Fig. 9, ref. 25).

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu and Kurihara et al., in view of Rolson (US 6,057,065).

Tzu and Kurihara et al. disclose the device previously recited. However, the references do not disclose that the mask is an absorption mask, and the characteristic is transmittance.

Rolson discloses an absorption mask (see col. 5, lines 14) wherein a characteristic is transmittance (see col. 5, lines 11-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the mask to be an absorption mask, and the characteristic is transmittance since such a modification would enable the intensity of the transmitted light to be varied, enabling a grating to be written on an optical device. Moreover, the variations of thickness illustrated in Tzu et al., would enable the device to vary the intensity of the transmitted light, as well. Therefore such a modification would be functionally equivalent.

4. Claims 8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu et al. and Kurihara et al., in view of Rolfson (US 5,376,483).

Referring to claims 8 and 10, Tzu and Kurihara et al. disclose the device previously recited. However, the reference does not disclose that the irregularity is operative to effectively

shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge.

Rolfson discloses an irregularity that is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge (see Fig. 1E, ref. 23,30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the irregularity operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge since such a formula would account for having one pixel on the edge, thereby dividing the size of the pixel by one would result in the size of the pixel. By having one pixel on the edge, one would be able to further vary the thickness of the mask according to one's specifications by shifting the pixel from one area to another, thereby enabling one to more precisely write a diffraction grating on an optical device.

Referring to claim 11, Tzu and Kurihara et al. disclose the device previously recited. However, the reference does not disclose that the irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge.

Rolfson discloses a device wherein an irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge (see Fig. 4f, ref. 42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the irregularity to be a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge in order to create a notch

(see Fig. 1E, ref. 30) and to further vary the thickness of the mask, thereby enabling a more precise and "custom" diffraction grating to be written on an optical device.

Referring to claim 12, Tzu and Kurihara et al. disclose the device previously recited. However, the reference does not disclose that the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge.

Rolfson discloses a device wherein the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge (see Fig. 1E, ref. 30, 24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the irregularity operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge since such a formula would account for having one pixel on the edge, thereby

dividing the size of the pixel by one would result in the size of the pixel. Through such a modification, one would be able to further vary the thickness of the mask from one region to another region, thereby enabling one to more precisely write a diffraction grating on an optical device, according to one's desired specifications.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu in view of Rolson.

Tzu discloses the device previously recited. However, the reference does not disclose that the mask is an absorption mask, and the bars have a different transmittance than the spaces.

Rolson discloses an absorption mask (see col. 5, lines 14) wherein the bars have different transmittance than the spaces (see col. 5, lines 11-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the mask to be an absorption mask and the bars have different transmittance than the spaces since such a modification would enable the intensity of the transmitted light to be varied, enabling a grating to be written on an optical device. Moreover, the variations of thickness illustrated in Tzu, would enable the device to vary the intensity of the transmitted light, as well. Therefore such a modification would be functionally equivalent.

6. Claims 19 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu and Rolfson.

Referring to claims 19 and 21, Tzu and discloses the device previously recited. However, the reference does not disclose that the irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge.

Rolfson discloses a device wherein an irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge (see Fig. 4f, ref. 42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the irregularity to be a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge in order to further vary the thickness of the mask, thereby enabling a more precise and "custom" diffraction grating to be written on an optical device.

Referring to claim 22, Tzu discloses the device previously recited. However, the reference does not disclose that the irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge.

Rolfson discloses a device wherein an irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge (see Fig. 4f, ref. 42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the irregularity to be a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge in order to further vary the thickness of the mask, thereby enabling a more precise and "custom" diffraction grating to be written on an optical device.

Referring to claim 23, Tzu discloses the device previously recited. However, the reference does not disclose that the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge.

Rolfson discloses a device wherein the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge (see Fig. 1E, ref. 30, 24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the irregularity operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge since such a formula would account for having one pixel on the edge, thereby dividing the size of the pixel by one would result in the size of the pixel. By having one pixel on the edge, such a modification would enable one to further vary the thickness of the mask from

one region to another region, thereby enabling one to more precisely write a diffraction grating on an optical device.

7. Claims 24-25, 26-27, 29-30, 32, 36-54 and 59-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu in view of Kurihara et al. and Laming et al. (US 6,459,705 B1).

Referring to claims 24, 36-42 and 44-47 Tzu discloses an optical device and method thereof comprising a substrate (see Fig. 9, ref. 20); a plurality of first optical regions (see Fig. 9, ref. 27); and a plurality of second optical regions that has a characteristic that is different from the plurality of first optical regions (see Fig. 9, ref. 23); wherein each of the first and second optical regions have a substantially polygon shape with a plurality of substantially regular edge (see Fig. 9, ref. 23, 27); and wherein at least one first optical region of the plurality of first optical regions includes a least one predetermined irregularity on at least one edge (see Fig. 9, ref. 22). However, the reference does not disclose that the first and second optical regions are interleaved with each other on the substrate. Further, the reference does not disclose that the device comprises a beam generator that provides an ultraviolet input beam; and a beam separator that receives an input beam and separates the input beam into a plurality of beams by diffracting the input beam into two first order beams; wherein the plurality of beams interfere with each other at the output plane to form an interference pattern that is used to from a bragg grating; a stop block which blocks a zero diffracted beam; and a focusing lens system that focuses the input beam only in a direction that is orthogonal from the optical axis of the fiber through the beam separator, thereby focusing the plurality of beams onto the output plane; wherein the beam separator is larger than a core of the optical fiber in a direction that is orthogonal to the optical

axis of the fiber; and an optical imaging system between the separator and the output plane that images the plurality of beams onto the output plane, wherein the optical imaging system only images light in a direction that is parallel to the optical axis of the optical fiber.

Kurihara et al. discloses a device wherein a first region and a second region are interleaved on a substrate (see Fig. 5). Laming et al. discloses a device comprising a beam generator that provides an ultraviolet input beam (see Fig. 1, ref. 10); and a beam separator that receives an input beam and separates the input beam into a plurality of beams by diffracting the input beam into two first order beams (see Fig. 1, ref. 40) wherein the plurality of beams interfere with each other at the output plane to form an interference pattern that is used to from a bragg grating (see Fig. 1, ref. 70; abstract); a stop block which blocks a zero diffracted beam (see Fig. 1, ref. 50); and a focusing lens system that focus the input beam only in a direction that is orthogonal from the optical axis of the fiber through the beam separator, thereby focusing the plurality of beams onto the output plane (see Fig. 1, ref. 60, 20); wherein the beam separator is larger than a core of the optical fiber in a direction that is orthogonal to the optical axis of the fiber (see Fig. 1, ref. 40 and 80); and an optical imaging system between the separator and the output plane that images the plurality of beams onto the output plane (see Fig. 1, ref. 60) wherein the optical imaging system only images light in a direction that is parallel to the optical axis of the optical fiber (see Fig. 1, ref. 60)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and second regions interleaved with each other on the substrate since such a modification would vary the thickness of the mask, and as a result enable a diffraction grating to be written on an optical device (see col. 2, lines 17-25). As a result, such a

modification would be functionally equivalent. Moreover, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a device comprising a beam generator that provides an ultraviolet input beam; and a beam separator that receives an input beam and separates the input beam into a plurality of beams by diffracting the input beam into two first order beams; wherein the plurality of beams interfere with each other at the output plane to form an interference pattern that is used to from a bragg grating; a stop block which blocks a zero diffracted beam; and a focusing lens system that focuses the input beam only in a direction that is orthogonal from the optical axis of the fiber through the beam separator, thereby focusing the plurality of beams onto the output plane; wherein the beam separator is larger than a core of the optical fiber in a direction that is orthogonal to the optical axis of the fiber; and an optical imaging system between the separator and the output plane that images the plurality of beams onto the output plane wherein the optical imaging system only images light in a direction that is parallel to the optical axis of the optical fiber since one would be motivated utilize the mask described Tzu and Kurihara et al. to precisely write a bragg grating on an optical fiber thereby enabling one to separate wavelengths to facilitate optical switch, filtering etc., thereby improving the ability for an optical fiber to selectively direct or filter an optical signal. Moreover, the intended use of the optical mask does not carry patentable weight.

Referring to claims 25, 53, 54 and 59-64, Tzu, Kurihara et al. and Laming et al. discloses the device and method previously recited. Tzu further discloses that the one irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge by an amount that is relative to a size of the one irregularity (see Fig. 9, ref. 22), the first and second

optical regions have a substantially polygon shape with a plurality of substantially regular edges (see Fig. 9), and arranging a plurality of pixels to form each polygon shape (see Fig. 9).

Referring to claim 26, Tzu discloses that the device is a mask and the first and second optical regions form an array (see Fig. 9; col. 4, lines 9-14).

Referring to claim 27, Tzu, Kurihara et al., and Laming et al. disclose the device previously recited. Tzu further discloses that the mask is a phase mask and the characteristic is thickness in the direction of an optical axis of the beam separator (see Fig. 9, abstract).

Referring to claim 29, Tzu discloses that the first and second optical regions are formed from a plurality of pixel arranged in the polygon shape (see Fig. 9).

Referring to claim 30, Tzu discloses that the irregularity is an extra pixel on one edge(see Fig. 9, ref. 22).

Referring to claim 32, Tzu discloses that the irregularity is a missing pixel (see Fig. 9, ref. 25).

Referring to claim 43, Tzu, Kurihara et al., and Laming et al. disclose the device previously recited. However, the reference does not disclose that the lens system comprises a cylindrical lens.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the lens system comprise a cylindrical lens since such a lens function to focus the beam, therefore the shape of the lens does not alter the function of the device, and therefore would be functionally equivalent. Moreover, such lenses are well known in the art as a focusing means.

Referring to claims 48-52 and 65-69, Tzu, Kurihara et al. and Laming et al. disclose the device previously recited. However, the references do not disclose that the grating is a chirped grating, linear chirped grating, a non-linear chirped grating or including a plurality of discrete phase shifts.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the grating to be a chirped grating, linear chirped grating, a non-linear chirped grating, including a plurality of discrete phase shifts, or including a substantially continuous and spatially varying phase shift since the type of grating written by the optical system lacks criticality, and therefore would be obvious. Moreover, intended use of the invention does not carry patentable weight.

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu, Kurihara et al. and Laming, further in view Rolson.

Tzu, Kurihara et al. and Laming et al. disclose the device previously recited. However, the references do not disclose that the mask is an absorption mask, and the characteristic is transmittance.

Rolson discloses an absorption mask (see col. 5, lines 14) wherein a characteristic is transmittance (see col. 5, lines 11-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the mask to be an absorption mask, and the characteristic is transmittance since such a modification would enable the intensity of the transmitted light to be varied, enabling a grating to be written on an optical device. Moreover, the variations of

thickness illustrated in Tzu et al., would enable the device to vary the intensity of the transmitted light, as well. Therefore such a modification would be functionally equivalent.

9. Claims 31, 33-35 and 55-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzu, Kurihara et al. and Laming et al., further in view of Rolfson.

Referring to claims 31, 33, 55 and 56, Tzu, Kurihara et al. and Laming et al. disclose the device and method previously recited. However, the reference does not disclose that the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge.

Rolfson discloses an irregularity that is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge (see Fig. 1E, ref. 23,30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the irregularity operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge since such a formula would account for having one pixel on the edge, thereby dividing the size of the pixel by one would result in the size of the pixel. By having one pixel on the edge, one would be able to further vary the thickness of the mask according to one's specifications by shifting the pixel from one area to another, thereby enabling one to more precisely write a diffraction grating on an optical device.

Referring to claim 34, Tzu, Kurihara et al. and Laming et al. disclose the device and method previously recited. However, the reference does not disclose that the irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge.

Rolfson discloses a device wherein an irregularity is a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge (see Fig. 4f, ref. 42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the irregularity to be a shifted pixel located on one edge which has been shifted from an opposite edge of the polygon shape from the one edge in order to create a notch (see Fig. 1E, ref. 30) and to further vary the thickness of the mask, thereby enabling a more precise and "custom" diffraction grating to be written on an optical device.

Referring to claims 35, 57 and 58, Tzu, Kurihara et al. and Laming et al. disclose the device and method previously recited. However, the reference does not disclose that the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge.

Rolfson discloses a device wherein the irregularity is operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity

is operative to effectively shift the other edge in a direction that is orthogonal to the edge and into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge (see Fig. 1E, ref. 30, 24).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the irregularity operative to effectively shift the one edge in a direction that is orthogonal to the edge and away from the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge; and the irregularity is operative to effectively shift the other edge in a direction that is orthogonal to the edge and away into the region by an amount that is the size of the shifted pixel divided by the number of pixels on the one edge since such a formula would account for having one pixel on the edge, thereby dividing the size of the pixel by one would result in the size of the pixel. Through such a modification, one would be able to further vary the thickness of the mask from one region to another region, thereby enabling one to more precisely write a diffraction grating on an optical device, according to one's desired specifications.

Response to Arguments

1. In response to applicant's traverse of the restriction requirement, Examiner has withdrawn the requirement and subsequently examined all pending claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard H Kim whose telephone number is (703)305-4791. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703)305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Richard H Kim
Examiner
Art Unit 2882

RHK
April 18, 2003